



U.S. Department
of Transportation

Pipeline and
Hazardous Materials
Safety Administration

East Building, PHH-23
1200 New Jersey Ave, SE
Washington, D.C. 20590

**COMPETENT AUTHORITY CERTIFICATION FOR A
TYPE B(U)F FISSILE
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/0561/B(U)F, REVISION 3**

**REVALIDATION OF CANADIAN COMPETENT AUTHORITY
CERTIFICATE CDN/0248/B(U)F**

The Competent Authority of the United States certifies that the radioactive material package design described in this certificate satisfies the regulatory requirements for a Type B(U)F package as prescribed in the regulations of the International Atomic Energy Agency¹ and the United States of America².

1. Package Identification - Model No. F-257, Serial No.2.
2. Package Description - as described in Canadian Certificate of Competent Authority CDN/0248/B(U)F, 9 (attached).
3. Authorized Radioactive Content - as described in Canadian Competent Authority Certificate CDN/2048/B(U)F, Revision 9, consistent with the following specifications.

The total package weight will not exceed 6,960 pounds.

The Saskatchewan Research Council SLOWPOKE-2 Reactor core is authorized by this certificate. This core shall be consistent with the following specifications:

Type of Nuclear Reactor Assemblies:	SLOWPOKE-2
Fuel Element Type:	Pin
Maximum mass of assembly:	5048.9 grams
Maximum number of fuel elements per package:	297 fuel pins
Maximum fuel element length:	23.56 cm
Maximum fuel element outer diameter:	0.61 cm
Maximum decay heat per package:	0.987 watt
Maximum initial enrichment, weight percent U-235:	93.18%
Maximum initial mass, U-235:	830.12 grams
Maximum initial mass, Uranium:	891 grams
Maximum burnup Kwh/fuel core:	220,230 Kwh
Minimum cooling time:	14 days

¹ "Regulations for the Safe Transport of Radioactive Material, 2012 Edition, No. SSR-6" published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

² Title 49, Code of Federal Regulations, Parts 100-199, United States of America.

CERTIFICATE USA/0561/B(U)F, REVISION 3

4. Criticality - The minimum criticality safety index is 100.
5. General Conditions -
 - a. Each user of this certificate must have in his possession a copy of this certificate and all documents necessary to properly prepare the package for transportation. The user shall prepare the package for shipment in accordance with the documentation and applicable regulations.
 - b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Office of Engineering and Research, (PHH-23), Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, Washington D.C. 20590-0001.
 - c. This certificate does not relieve any consignor or carrier from compliance with any requirement of the Government of any country through or into which the package is to be transported.
6. Special Condition - The package must have completed a periodic leakage test, in accordance with ANSI N14.5, to verify a leakage rate not to exceed 1×10^{-7} std-cm³/s within one year prior to shipment.
7. Marking and Labeling - The package shall bear the marking USA/0561/B(U)F in addition to other required markings and labeling.
8. Expiration Date - This certificate expires on September 30, 2021.

CERTIFICATE USA/0561/B(U)F, REVISION 3

This certificate is issued in accordance with paragraph(s) 816 and 820 of the IAEA Regulations and Section 173.472 and 173.473 of Title 49 of the Code of Federal Regulations, in response to the August 28, 2018 petition by Secured Transportation Services, Buford, GA, and in consideration of other information on file in this Office.

Certified By:



May 17, 2019

(DATE)

 William Schoonover
Associate Administrator for Hazardous
Materials Safety

Revision 3 - Issued to endorse Canadian Competent Authority Certificate CDN/2048/B(U)F, Revision 9 with contents as given in paragraph 3, CSI as given in paragraph 4, and the special condition of paragraph 6.



Certificate

CDN/2048/B(U)F (Rev. 9)

Transport Package Design

The transport package design identified below is certified by the Canadian Nuclear Safety Commission pursuant to paragraph 21(1)(h) of the *Nuclear Safety and Control Act* and Subsection 10(1) of the *Packaging and Transport of Nuclear Substances Regulations*, 2015 and to the 1973 Revised Edition (as amended) of the IAEA's *Regulations for the Safe Transport of Radioactive Material*.

REGISTRATION OF USE OF PACKAGES

All users of this authorization shall register their identity in writing with the Canadian Nuclear Safety Commission prior to the first use of this authorization and shall certify that they possess the instructions necessary for preparation of the package for shipment.

PACKAGE IDENTIFICATION

Designer: **Atomic Energy of Canada Limited**
Make/Model: **F-257 Shipping Package, Serial No. 002**
Mode of Transport: **Rail, Road, Sea**

IDENTIFICATION MARK

The package shall bear the competent authority identification mark "**CDN/2048/B(U)F**".

PACKAGE DESCRIPTION

The packaging, as shown on Nordion International Drawing No. F125701-001 (Rev. D), consists of an inner container and an impact limiting fire shield overpack. The container is a stainless steel encased lead cylinder, with a removable top plug attached by eight high strength 5/8 inch diameter bolts. Sealing is provided by a silicone "O" ring. Vent and drain lines are supplied to facilitate wet loading. The lines are safety plugged. The inner container is mounted onto the disk base of the overpack by four steel brackets and eight 3/4 inch diameter bolts.

The overpack consists of a double carbon steel wall, capped cylinder mounted on a disk base. The cylinder voids are filled with "Fibrefax" thermal insulation. "Transite" sheets protect the base. External fins are welded to the outer skin to provide heat transfer and impact absorption. Hoisting lugs are integral with four of these fins. The overpack cylinder is attached to the base by twelve 1 inch diameter bolts. Skids are provided for mechanical handling.



An illustration of the package is shown on attached Drawing No. SLWPK-F125701-4 (Rev. 0).

Any modification to the package design must be submitted to the Canadian Nuclear Safety Commission for approval prior to implementation.

The configuration of the package is as follows:

Shape: Cylinder	Shielding: Lead
Mass: 3163 kg	Outer Casing: Steel
Length: n/a	Height: 1522 mm
Width: n/a	Diameter: 1255 mm

AUTHORIZED RADIOACTIVE CONTENTS

This package is authorized to contain one irradiated SLOWPOKE fuel core consisting of up to 342 uranium-aluminum alloy fuel rods, as described on AECL Drawing No. A10720 (Rev. E), contained within an aluminum alloy cage as shown on AECL Drawing No. A10721 (Rev. J). Each rod is 28% - 72% by weight uranium-aluminum with a maximum enrichment of 93.5% U-235. The maximum mass of U-235 is 2.8 g per rod before irradiation.

QUALITY ASSURANCE

Quality assurance for the design, manufacture, testing, documentation, use, maintenance and inspection of the package shall be in accordance with:

- Packaging and Transport of Nuclear Substances Regulations, 2015
- IAEA Regulations for the Safe Transport of Radioactive Material, 2012 Edition

SHIPMENT

The preparation for shipment of the package shall be in accordance with:

- AECL Operating Procedure No. SLWPK-35000-PRO-001 (Rev. 1) "Preparation for Shipment of the F-257 Transport Package"
- Packaging and Transport of Nuclear Substances Regulations, 2015
- IAEA Regulations for the Safe Transport of Radioactive Material, 2012 Edition



Shipment is authorized as fissile with a minimum Criticality Safety Index (CSI) of 50 for criticality control.

Post irradiation decay time shall not be less than 48 hours.

This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.

S. Faille

Designated Officer pursuant to paragraph 37(2)(a) of
the Nuclear Safety and Control Act



Canada's Nuclear Regulator
L'organisme de réglementation
nucléaire du Canada

NOTES

Revision 8: December 18, 2012. Certificate issued.

Revision 9: July 29, 2016. Certificate issued.



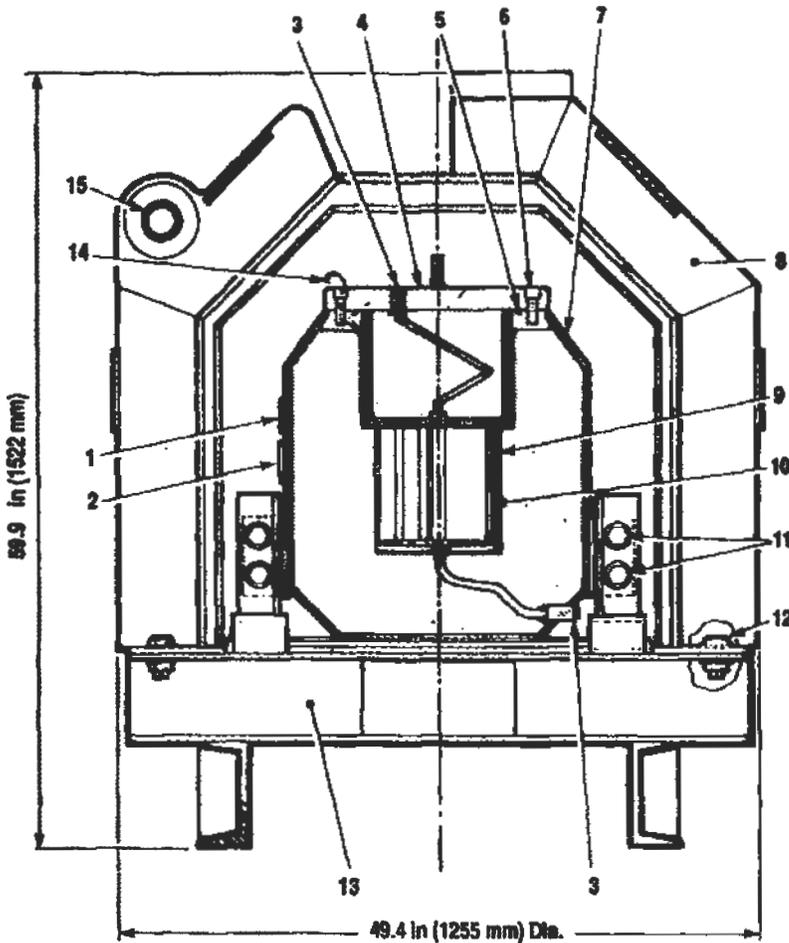
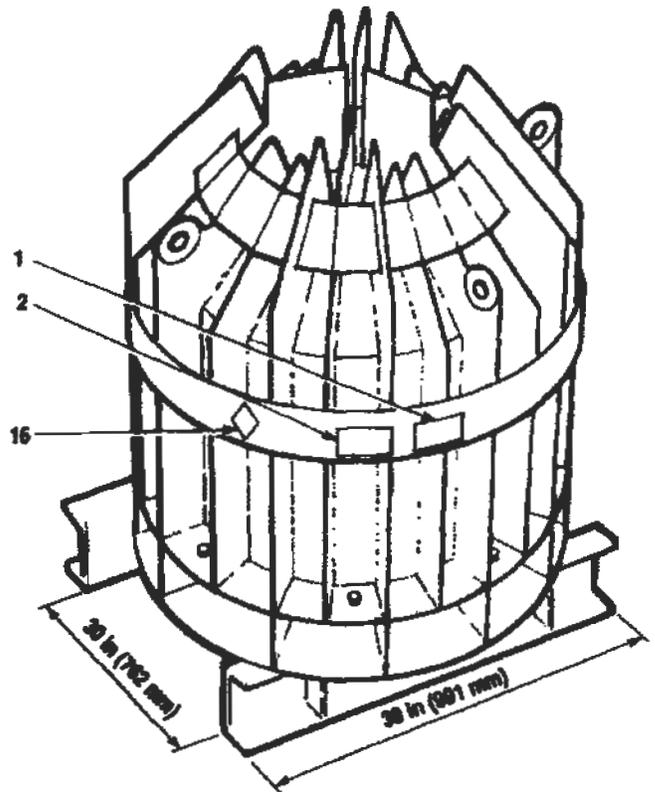
Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

Canada

Parts List

1. AECL identification plate (4)
2. Radiation caution plate (4)
3. Brass pipe plugs 1/2 NPT (2)
4. Removable closure plug - steel encased lead
5. Silicone rubber 'O' ring seal
6. Closure plug screws "UNBRAKO": 5/8 -11 UNC x 1.88 in (48 mm) long (8)
7. Flask proper - steel encased lead : 6.38 in. min. (162 mm)
8. Removable fire /crush shield (top)
9. Internal cavity, ID 9.0 in (229 mm) x 9.5 in (241 mm)
10. Radioactive contents
11. Flask bolts : 3/4 - 10 UNC x 2.5 in (64 mm) long
ASTM A354 grade BD (8)
12. Fire/crush shield bolts : 1 - 8 UNC x 3 in (76 mm) long
ASTM A354 grade BD (12)
13. Removable fire /crush shield assembly (bottom)
14. Wire seal (2) through holes in heads of 2 adjacent screws
15. Lifting eyes (4)
16. Radioactive Category I, II or III labels (2)



Notes

1. CNSC certification No. CDN/2048 B(U/F)
2. Weight (estimated)

Flask Proper	3,490 lb (1,586 kg)
Plug	420 lb (191 kg)
Fire/Crush Shield (Top)	1,875 lb (852 kg)
Fire/Crush Shield (Bottom)	1,175 lb (534 kg)
Total	6,960 lb (3,163 kg)
3. Floor loading (based on projected floor area):
696 lb/sq ft (3398 kg/m²)
4. This packaging is prepared for shipment in accordance with AECL procedure SLWPK-36800-PRO-001
5. Reference drawing SLWPK-F125701-1

CONTROLLED

No part of this document nor any information contained in it may be transmitted in any form to any third parties except with the prior written consent of Atomic Energy of Canada Limited.

F-257 Transport Packaging
(for Slowpoke - 2
spent fuel core)

PREP	R. Hampel	DATE	04 Oct 26
CHKD	<i>D. Prout</i>	DATE	2004-10-26
DSGN	<i>JP</i>	DATE	2004-10-26
APPO	<i>S. Selovsky</i>	DATE	04.11.01
ACPT		DATE	

★ AECL EACL

CHALK RIVER LABORATORIES
CHALK RIVER ONTARIO CANADA

BLOG	CODE	CLASS

JOB NO. 13315

DWG NO. SLWPK-F125701-4

REV 0



U.S. Department of
Transportation

**Pipeline and
Hazardous Materials
Safety Administration**

East Building, PHH-23
1200 New Jersey Ave, SE
Washington, D.C. 20590

CERTIFICATE NUMBER: USA/0561/B(U)F-85

ORIGINAL REGISTRANT(S) :

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